

**PHASE-CONTINUOUS FREQUENCY SYNTHESIZER**

**ABSTRACT**

A digitally controlled frequency synthesizer has a first direct digital synthesizer that generates a first phase-coherent, time-varying frequency, and a second direct digital synthesizer that generates an offset frequency waveform. A plurality of cascaded frequency converters successively combine the offset frequency waveform with a reference frequency waveform to produce a plurality of waveforms having respectively different frequencies. A switch switches between the plurality of waveforms produced by the cascaded frequency converters to realize a second waveform. The operation of the second direct digital synthesizer is controlled so as to maintain phase continuity between respective ones of the plurality of waveforms contained in the second waveform as output by the switch. A mixer multiplies the first waveform by the second waveform to produce a time-varying output frequency.